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RESEARCH ARTICLE

New data on the distribution of the threatened Marsh Fritillary – *Euphydryas aurinia* (Lepidoptera: Nymphalidae) – in Romania

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Abstract

Euphydryas aurinia, a highly endangered species listed on the Annex II of the Habitats Directive as well as on the Annex II of the Bern Convention, has a wide distribution in the Palearctic realm. Although it is an intensively studied species, its distribution is still not enough known. In Romania, in the last century it has been reported almost exclusively from the regions inside and westwards to the Carpathian Mountains. Records from Oltenia and Wallachia are filling a gap in the known distribution of this butterfly in the southern part of Romania, while 13 new records consolidate the known range of this species in southern and eastern Transylvania. In order to assess the progress encountered, a critical reviewed checklist with the records of the Marsh Fritillary presented in a regional distribution map complete this paper.

Keywords

protected species, faunistic note, new record, distribution.

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PENSOFT

Introduction

The Marsh Fritillary, *Euphydryas aurinia* (Rottemburg, 1775), is a butterfly largely distributed in the Palaearctic region, from western Europe (westwards from Ireland, Great Britain – records also from Scotland – and Portugal) and Northwest Africa (Morocco and Algeria) to Anatolia, southern Urals, the Caucasus and northern Iran, and furthermore eastwards to the Altai through Mongolia, southern and eastern Siberia, northern China and Korea. In the western Palaearctic region, this species is found only locally in Great Britain, Denmark, Sweden and Finland as well as in Italy and Greece, where it is absent in most areas. However, it is entirely absent from Iceland, Norway, Channel Islands, the Isle of Man and the Mediterranean islands, but occurs locally in the mountains of Morocco and Algeria (Leraut 2016). Although it can be locally common in certain parts of its distribution realm, it has clearly and strongly declined all over Europe (for example, it has greatly declined in Île-de-France – Leraut 2016). It has been reported as threatened in 39 European countries and is already extinct in one European country, being credited with an overall decrease trend of 20–50% in Europe, despite data-quality poor or trend unknown in more than 50% of the range (van Swaay and Warren 1999). Also, in spite of being regarded as least concern in most of Europe (van Swaay et al. 2010; Maes et al. 2019), this butterfly is listed on the Annexes II of the Habitats Directive of the European Union, no more than 16 LIFE projects targeted towards either this species or its habitats have been developed (van Swaay et al. 2010) and a total number of 1381 Natura2000 sites have been designated up to now for the conservation of this species.

Currently, a number of 22 Natura2000 sites are designated in Romania for the conservation of the Marsh Fritillary. According to the data from 2013–2018 available for reporting under the Article 17 of the Habitats Directive, in Romania, the areas where the Marsh Fritillary has been found have a total range of 4100 km^2 in the continental bioregion (1.89 % of the surface occupied by this bioregion in Romania) and 2100 km^2 in the alpine bioregion (1.65% of surface of this bioregion in Romania): For the both bioregions, the conservation status is favourable (see Article 17 web tool).

However, in Romania, the Marsh Fritillary is listed as vulnerable at the national scale (Rákosy 2021; Rákosy et al. 2021). Despite having been considered by some authors (Székely 2008) as common but very local, its populations appear to be limited to locally restricted areas. Until the last decade, it was known only from Transylvania, Banat and Crișana (Székely 2008; Mihăilescu et al. 2015; Rákosy and Goia 2021), with very old records (unconfirmed in the last century) from the others regions of Romania (Rákosy and Goia 2021). However, recognizing the insufficient knowledge of the distribution of this species in Romania, some pointed out that "for sure, the number of the populations is higher than the one currently known" (Rákosy 2013). This gap in the known distribution of the Marsh Fritillary in Romania is also noticed by Székely (2008).

Following early records from Săcărâmb (Franzenau 1852), Ciucurova (Mann 1866), Cisnădie, Cisnădioara, Sibiu (Sibiu County) and Előpatak / Vâlcele (Covasna

County – Czekelius 1895), the known distribution of the Marsh Fritillary in Romania gradually extended starting with the early XXth century. However, outside the Carpathians Mountains, there are only old and unconfirmed reports of the Marsh Fritillary. For instance, eastwards of the Eastern Carpathians, old records are known from Comănești, Bacău County (specimens captured by Nicolae Leon; Fleck 1900), Botoșani – specimens captured long before '990s by prof. Ioan Nemeș, cited by Székely (1992) who also stipulates that he did not find again this species – and Ursache forest, Botoșani County (Lungoci 1972). Nevertheless, none of these records could be certified following the revision of a specimen preserved in a collection, nor confirmed by new captures in the last half of century. To the south, doubtful records have been published by Chimișliu and Goga (2005) based on specimens in the Ioan Stănoiu collection captured at Baia de Aramă, Mehedinți County and Cozia Mountains (specimen captured on August 20, raising serious questions regarding the truth identity of this particular specimen, if not all the Marsh Fritillary specimens found in the Ioan Stănoiu collection and/or the accuracy of the collecting data from this collection catalogue).

Material and methods

Recently, *E. aurinia* has been recorded from Filiași, Dolj County (Chimișliu 2011) and Işalnița, Dolj County (Chimișliu 2012). These two reports have been certified following a revision of the Marsh Fritillary specimens found in the collections of the Olteniei Museum, Craiova. On this occasion, another female specimen collected by Cornelia Chimișliu on May 24, 1994 at Răcari, Dolj County was found, thereby increasing the number of recorded populations from Oltenia. A year later, another record for the Marsh Fritillary in westernmost part of Oltenia was reported at about 0,5 km north-east from Cireșu, Mehedinți County (Papé et al. 2013, fig. 37).

In Bulgaria, during the last decades, the Marsh Fritillary was reported northward as far as Hotnitsa, Veliko Tarnovo Province (specimen photographed by Ray Hamilton, May 13, 2011), Omurtag, Targovishte Province (specimen photographed by Gulsen Mutlu, May 29, 2011; Beshkov pers. com.) and Kamtchiya, Ribarskoto selishte, Varna Province (specimen photographed by B. Benedek, May 15, 2010; Beshkov pers. com.). Taking into account the known reports from Romania and Bulgaria (see Table 1), this leaves a fairly substantially large area without any report between the Transylvanian Alps and the Danube, and even further, south of the Danube (Fig. 1).

Following the growing efforts dedicated to increase the known distribution of the Marsh Fritillary in Romania, Tibor-Csaba Vizauer managed to discover an important number of populations of this butterfly in the Ciuc Mountains (see Table 1), thus confirming previous reports (Kovács and Kovács 1986; Sándor and Székely 2020), but significantly increasing the number of known populations in this region. Moreover, on this occasion several populations were identified at altitudes well over

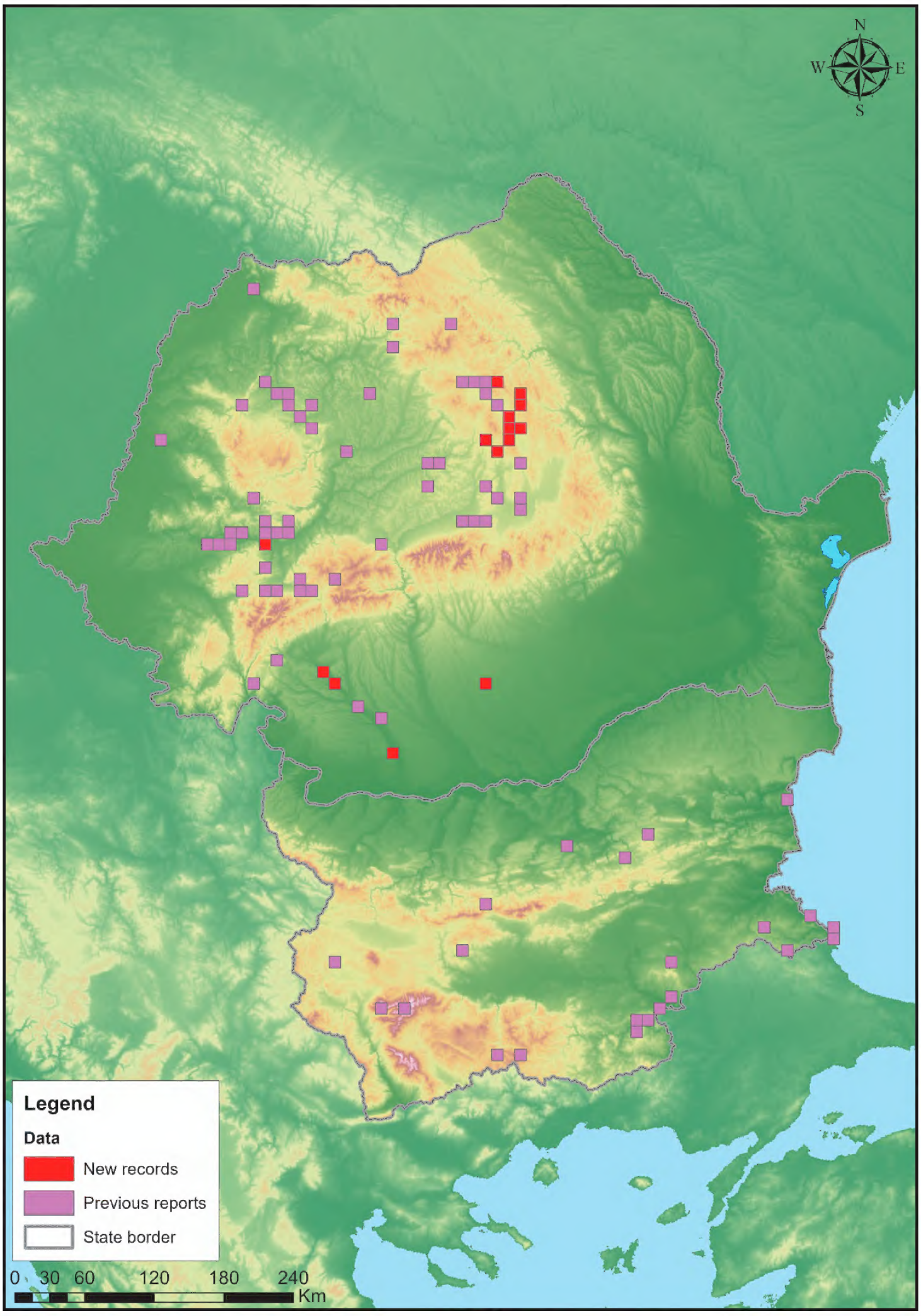

Figure 1. The distribution of *Euphydryas aurinia* in Bulgaria and Romania, with the new records from Oltenia and Wallachia; the coordinates of the reporting points are presented in the table 1.

Tabel 1. The list with the Marsh Fritillary reports from Bulgaria and Romania; for Romania, the old records from the XIXth century, unconfirmed during the last century, were excluded.

Locality and station	Country and region	Latitude	Longitude	Reference
Strandzha Mountains, Tsarnogorovo place, near Malko Tarnovo, Strandzha Nature Park	Bulgaria, Burgas Region	41.951° N	27.569° E	leg. Stoyan Beshkov and Boyan Zlatkov, 12.05.2008; Zlatkov and Beshkov 2009; Beshkov 2009
Rezovo, Strandzha Nature Park	Bulgaria, Burgas Region	41.987° N	28.019° E	leg. Stoyan Beshkov and Boyan Zlatkov, 24.04.–27.05.2008; Beshkov, 2009
Silistar Plazh near Rezovo, Strandzha Nature Park	Bulgaria, Burgas Region	42.023° N	28.006° E	leg. Stoyan Beshkov and Boyan Zlatkov, 28.05.2008; Beshkov, 2009
to the south, next to the fence of the „Zlatnata Perla", north from Varvara, Strandzha Nature Park	Bulgaria, Burgas Region	42.140° N	27.896° E	leg. Stoyan Beshkov and Boyan Zlatkov, 27.05.2008; Beshkov, 2009
to the north, next to the fence of the „Zlatnata Perla", north from Varvara, Strandzha Nature Park	Bulgaria, Burgas Region	42.142° N	27.893° E	leg. Stoyan Beshkov and Boyan Zlatkov, 27.05.2008; Beshkov, 2009
Mladezhko	Bulgaria, Burgas Region	42.152° N	27.378° E	leg. Stoyan Beshkov and Boyan Zlatkov, 29.05.2008; Beshkov, 2009
Momina Skala above Madzharovo	Bulgaria, Haskovo Region	41.633° N	25.844° E	leg. Stoyan Beshkov, Stanislav Abadjiev & Chris van Swaay, 21.05.2006
Arda chalet, near Dabovetz	Bulgaria, Haskovo Region	41.636° N	25.990° E	leg. Stoyan Beshkov, Stanislav Abadjiev and Chris van Swaay, 20.05.2006
Arda Valley, opposite Kovan Kayabetween Bryagovetz and Momina Skala chalet	Bulgaria, Haskovo Region	41.637° N	25.850° E	leg. Stoyan Beshkov, I. Stoytchev and I. Duparinov, 04.05.2000
4 km from the bridge on Arda River near Madzharovo on the road to Borislavtzi	Bulgaria, Haskovo Region	41.645° N	25.881° E	leg. Stoyan Beshkov and H. Beck, 22.05.2004
Yazovir Ivaylovgrad Dam, Arda chalet, near Dabovetz	Bulgaria, Haskovo Region	41.656° N	25.973° E	leg. Stoyan Beshkov and Nikolay D. Kodzhabashev, 27.04.1990
„Kromleh" near Dolni Glavanak	Bulgaria, Haskovo Region	41.685° N	25.808° E	leg. Stoyan Beshkov, Stanislav Abadjiev and Chris van Swaay, 17.05.2006
Sheynovetz, above Mezek	Bulgaria, Haskovo Region	41.718° N	26.065° E	leg. Stoyan Beshkov and M. Beshkova, 04.05.2013
near Mustrak	Bulgaria, Haskovo Region	41.855° N	26.297° E	leg. Stoyan Beshkov and Ana Nahirnić, 03.05.2019
between Topolovgrad and Sinapovo	Bulgaria, Haskovo Region	42.115° N	26.399° E	leg. Stoyan Beshkov and Ana Nahirnić, 04.05.2019
National Park Rilski Manastir, Tiha Rila, near the end of the road to Ribni Ezera	Bulgaria, Kyustendil Region	42.133° N	23.481° E	leg. Stoyan Beshkov, M. Marinov and N. Dilchev, 29.07.1997
Ravna, above Rilski Manastir to Ivan Vazov hut	Bulgaria, Kyustendil Region	42.140° N	23.322° E	leg. Stoyan Beshkov, Stanislav Abadjiev and T. Yanakiev, 22.07.1989
Mine Persenk, Tchepelare district	Bulgaria, Lovech Region	42.846° N	24.549° E	leg. Stanislav Abadjiev, 16.05.1986

Table 1. (continued)

Locality and station	Country and region	Latitude	Longitude	Reference
between Panagyurishte and Streltcha, Popintsi Natura 2000 site	Bulgaria, Pazardzhik Region	42.482° N	24.235° E	leg. Stoyan Beshkov and R. Bekchiev, 02.06.2017
Kovatchevtzi	Bulgaria, Pernik Region	42.553° N	22.823° E	leg. Nikolay D. Kodzhabashev, 2–7.VII.1996
Tchairdere near Osmanov Vir, surroundings of Trigrad	Bulgaria, Smolean Region	41.624° N	24.395° E	leg. Stoyan Beshkov, 2005–2015
Sveti Spas Capel above Stoykite	Bulgaria, Smolean Region	41.644° N	24.637° E	leg. Stoyan Beshkov, 14.06.2011
Omurtag	Bulgaria, Targovishte Region	43.117° N	26.426° E	photo Gulsen Mutlu, 29.05.2011
Kamtchiya, Ribarskoto selishte	Bulgaria, Varna Region	43.125° N	27.925° E	photo B. Benedek, 15.05.2010
Krumchevtzi near Maysko	Bulgaria, Veliko Tarnovo Region	42.934° N	26.119° E	leg. Stoyan Beshkov and M. Beshkova, 07.05.2012
Hotnitsa	Bulgaria, Veliko Tarnovo Region	43.163° N	25.558° E	photo Ray Hamilton, 13.05.2011
Căpâlnaș	Romania, Arad County	45.967° N	22.236° E	König 1975; Burnaz 1993c; Stănescu 1995
Tinca	Romania, Bihor County	46.774° N	21.930° E	Ilie and Marinescu 2019; this report could not be verified based on captured specimens and/or field photos
Sânmihaiu de Câmpie	Romania, Bistrița-Năsăud County	46.892° N	24.335° E	Vicol 1986; Ruști 1987
Prundu Bârgăului	Romania, Bistrița-Năsăud County	47.219° N	24.741° E	Ruști 1987
Prundu Bârgăului, Chicera Valley	Romania, Bistrița-Năsăud County	47.219° N	24.741° E	Togănel 1995
Maieru	Romania, Bistrița-Năsăud County	47.400° N	24.744° E	Ilie & Hoza 2019; this report could not be verified based on captured specimens and/or field photos
Șinca Nouă, Strâmba Valley	Romania, Brașov County	45.698° N	25.247° E	Rákosy 2009
Prejmer Forest	Romania, Brașov County	45.742° N	25.742° E	Székely et al. 2017
Vlădeni	Romania, Brașov County	45.762° N	25.360° E	Ciochia and Barbu 1980; Székely 1996
Șinca Veche	Romania, Brașov County	45.762° N	25.172° E	Ciochia and Barbu 1980
Șercaia, Dumbrava Vadului	Romania, Brașov County	45.772° N	25.102° E	Székely et al. 2000; Székely 2004; Dincă and Vila 2008; Székely and Görbe 2019
Bogății Forest	Romania, Brașov County	45.905° N	25.480° E	Székely et al. 2017; data corroborated with the management plan of Natura2000 site ROSCI0137 Pădurea Bogății (Vizauer, pers. com.)
Racoș	Romania, Brașov County	46.024° N	25.409° E	Székely 1996; Dincă and Vila 2008
Băuțar	Romania, Caraș-Severin County	45.516° N	22.566° E	Burnaz 2011

Table 1. (continued)

Locality and station	Country and region	Latitude	Longitude	Reference
Cornişoru	Romania, Caraş-Severin County	45.520° N	22.562° E	Burnaz 2011
Sălicea	Romania, Cluj County	46.675° N	23.525° E	Rákosy 1988
Cluj-Napoca, Gârbăului Valley	Romania, Cluj County	46.720° N	23.535° E	photo Diana Buchilă, 1.06.2020
Cluj-Napoca, Baciu Forest	Romania, Cluj County	46.785° N	23.536° E	Goia and Dincă 2006
Dealurile Clujului de Est Natura 2000 site (ROSCI0295)	Romania, Cluj County	46.900° N	23.600° E	Craioveanu et al. 2016
Şardu, Valea Şardului	Romania, Cluj County	46.902° N	23.355° E	Junker et al. 2015
Satu Lung	Romania, Cluj County	46.911° N	23.593° E	Pecsenye et al. 2018
Ciocaş Hill	Romania, Covasna County	45.772° N	25.687° E	Székely et al. 2017
Vâlcele	Romania, Covasna County	45.852° N	25.681° E	Czekelius 1895; Székely et al. 2017
Bixad	Romania, Covasna County	46.105° N	25.859° E	Kovács and Kovács 1986
Işalniţa	Romania, Dolj County	44.392° N	23.741° E	Chimişliu 2012
Răcari	Romania, Dolj County	44.504° N	23.549° E	leg. Cornelia Chimişliu, 24.05.1994; specimen in the collections of the Olteniei Museum, Craiova
Filiaşi	Romania, Dolj County	44.554° N	23.520° E	Chimişliu 2011
Vârghişului Gorge	Romania, Harghita County	46.205° N	25.539° E	Kovács and Kovács 1986
Sâncrăieni, Valea Mare	Romania, Harghita County	46.301° N	25.786° E	Kovács and Kovács 1986
Vlăhiţa	Romania, Harghita County	46.321° N	25.513° E	Sándor and Székely 2020, confirmed by obs. Tibor-Csaba Vizauer, 2022
Băile Jigodin	Romania, Harghita County	46.340° N	25.809° E	obs. Tibor-Csaba Vizauer, 2011, 2022
Cioboteni	Romania, Harghita County	46.382° N	25.830° E	obs. Tibor-Csaba Vizauer, 2011
Cioboteni, Şumuleu Valley	Romania, Harghita County	46.376° N	25.854° E	obs. Tibor-Csaba Vizauer, 2020
Potiond	Romania, Harghita County	46.393° N	25.958° E	obs. Tibor-Csaba Vizauer, 2020
Delniţa	Romania, Harghita County	46.412° N	25.829° E	obs. Tibor-Csaba Vizauer, 2011
Delniţa, Băile Bârzava	Romania, Harghita County	46.426° N	25.840° E	obs. Tibor-Csaba Vizauer, 2020
Frumoasa, Ciucului Mountains	Romania, Harghita County	46.453° N	25.853° E	obs. Tibor-Csaba Vizauer, 2011
Comiat	Romania, Harghita County	46.521° N	25.947° E	obs. Tibor-Csaba Vizauer, 2020

Table 1. (continued)

Locality and station	Country and region	Latitude	Longitude	Reference
Ciucului Mountains, Ugra Valley (Ugrapataka)	Romania, Harghita County	46.527° N	26.002° E	caterpillars and their webs obs. Tibor-Csaba Vizauer, 2019
Izvoru Mureşului	Romania, Harghita County	46.622° N	25.689° E	Sándor and Székely 2020
Lunca de Jos, Iavardi Valley (Jávárdi-patak)	Romania, Harghita County	46.625° N	25.924° E	obs. Tibor-Csaba Vizauer, 2011
Gheorgheni	Romania, Harghita County	46.720° N	25.590° E	Sándor and Székely 2020
Gheorgheni, Belchia Valley	Romania, Harghita County	46.736° N	25.584° E	Sándor and Székely 2020
Gheorgheni, Chiurutul Mijlociu Valley (Közép-Kürüc)	Romania, Harghita County	46.746° N	25.592° E	obs. Tibor-Csaba Vizauer, 2022
Izvoru Cerbului (Szarvas forrás)	Romania, Harghita County	46.741° N	25.665° E	Sándor and Székely 2020
Lăzarea	Romania, Harghita County	46.755° N	25.546° E	Sándor and Székely 2020
Hăşmaş Mountains, near Suhardul Mic	Romania, Harghita County	46.798° N	25.791° E	obs. Tibor-Csaba Vizauer, 17.06.2016
Făgeţel	Romania, Harghita County	46.835° N	25.305° E	obs. Sorin Stanciu, 12.06.2018
Băniţa - Bolii Hill	Romania, Hunedoara County	45.447° N	23.320° E	Burnaz 2002
Băniţei Gorge	Romania, Hunedoara County	45.449° N	23.311° E	Burnaz 2002
Crivadia Gorge	Romania, Hunedoara County	45.468° N	23.214° E	Burnaz 2002
"Nucşoara daffodil hayfields" nature reserve	Romania, Hunedoara County	45.499° N	22.941° E	Burnaz 2008b; Burnaz and Ruşti 2009
Zeicani	Romania, Hunedoara County	45.499° N	22.726° E	Burnaz & Balász 2011
Sălaşu de Sus, meadow	Romania, Hunedoara County	45.514° N	22.956° E	Burnaz 2007
Şureanu Mountains	Romania, Hunedoara County	45.542° N	23.514° E	Burnaz 1993c
Karst region Ponorici-Cioclovina	Romania, Hunedoara County	45.572° N	23.145° E	Burnaz 2002
Govăjdie	Romania, Hunedoara County	45.739° N	22.795° E	Burnaz 2002
Archia, Bejan forest	Romania, Hunedoara County	45.847° N	22.886° E	obs. Tibor-Csaba Vizauer and Ágnes Kastal, 2020
Almaşu Sec, Bejan forest	Romania, Hunedoara County	45.857° N	22.863° E	foto Alexandru Rădac, 24.04.2019
Buceş-Vulcan Mountain	Romania, Hunedoara County	45.926° N	23.099° E	Burnaz 2002
Mureşului river valley, between Gurasada and Zam	Romania, Hunedoara County	45.945° N	22.495° E	Burnaz 2010
Lunca	Romania, Hunedoara County	45.973° N	22.869° E	Burnaz 1992; Burnaz 2005

Table 1. (continued)

Locality and station	Country and region	Latitude	Longitude	Reference
Săcărâmb	Romania, Hunedoara County	45.974° N	23.038° E	Burnaz 1997
Zam	Romania, Hunedoara County	46.000° N	22.450° E	Burnaz 2002
Mada Gorge	Romania, Hunedoara County	46.008° N	23.124° E	Burnaz 1992; Burnaz 1993b; Burnaz 1993c; Burnaz 2002
Ardeului Gorge	Romania, Hunedoara County	46.016° N	23.144° E	Burnaz 2002
Boiu de Sus	Romania, Hunedoara County	46.019° N	22.590° E	Burnaz 2002
Crăciunești Gorge	Romania, Hunedoara County	46.024° N	22.872° E	Burnaz 1992; Burnaz 1993c; Burnaz 2005
Godinești	Romania, Hunedoara County	46.024° N	22.533° E	Burnaz 1992; Burnaz 1993c; Burnaz 2002
Ribicioarei Gorge	Romania, Hunedoara County	46.236° N	22.770° E	Burnaz 2002
Șureanu Mountains, Valea Luncani	Romania, Hunedoara County	46.472° N	23.951° E	Burnaz 1993a
0,5 km north-east of Cireșu	Romania, Mehedinți County	44.829° N	22.544° E	Papé et al. 2013
Baia de Aramă	Romania, Mehedinți County	45.000° N	22.811° E	Chimișliu and Goga 2005
Sighișoara-Târnava Mare Natura 2000 site (ROSCI0227)	Romania, Mureș County	46.109° N	24.820° E	Rákosy 2010
Saschiz	Romania, Mureș County	46.194° N	24.962° E	Schneider 1984
Sighișoara	Romania, Mureș County	46.217° N	24.791° E	Rákosy and Weber 1986
Mujdeni	Romania, Satu Mare County	47.845° N	23.253° E	Ardelean 1998
Mujdeni Forest	Romania, Satu Mare County	47.853° N	23.205° E	Szabó 2008
Stana	Romania, Sălaj County	46.833° N	23.117° E	Junker et al. 2015; however, the coordinates provided in this published paper (46° 50' N, 23° 07' E) correspond to a point located near Izvoru Crișului, Cluj county, about 5,5 km south from Stana
Bozolnic, graveyard	Romania, Sălaj County	46.970° N	23.228° E	leg. Carol Bere and C. Radu, 07.06.1997
Meseșului Mountains, Poicu stream	Romania, Sălaj County	46.979° N	22.927° E	Bálint et al. 2016
Ugruțiu, Almaș-Agrij Depression	Romania, Sălaj County	47.019° N	23.363° E	Bálint et al. 2016; Katona et al. 2016
Dumbrava Sibiului	Romania, Sibiu County	45.742° N	24.091° E	Niculescu, 1965
Panaci	Romania, Suceava County	47.234° N	25.369° E	obs. Constantin Corduneanu, 23.06.2022
Groși	Romania, Timiș County	45.915° N	22.285° E	Stănescu 2005

1000 m, thus increasing the altitude up to which this species can be found in Romania compared to previous reports (Székely 2008).

During the first decade of May 2015, Prunar and Ardelean have targeted the specific habitat and found specimens of this butterfly at the edge of the Hotăroasa forest, Gorj County (May 3, 44.815° N, 23.248° E), Bratovoești, Pădurea lui Barbu, Dolj County (May 8, 44.103° N, 23.891° E; Fig. 2) and Gârbovu, Dealu Mare Monastery, Gorj County (May 9, 44.719° N, 23.317° E; Fig. 3). All these reports were within the limits of the Natura2000 site ROSCI0045 Coridorul Jiului. The number of the spotted specimens was particularly high in the vicinity of the Dealu Mare Monastery, near the village Gârbovu, Gorj County. These findings have confirmed the presence of the Marsh Fritillary in Oltenia.

About 7 years later came the first record from Wallachia: following a rather unsteady and cold spring, during May 2022 weather has improved substantially and conditions were met for resuming the field searches. Taking advantage of these conditions, Alexandru Iftime chanced upon a suitable habitat for the Marsh Fritillary north from Goia, Argeș County, at the edge of the Voineasca forest. It was in the early afternoon of May 7, 2022, when he managed to spot and photograph of a Marsh Fritillary female (Fig. 4) flying along a woodland edge (44.535° N, 24.999° E). Unlike the populations identified in Oltenia during 2015, this one is not located on the territory of a protected area. Nevertheless, together with the above-mentioned

Figure 2. *Euphydryas aurinia* – Bratovoiești, Pădurea lui Barbu (Dolj County). May 8, 2015; photo Florin Prunar and Adorian Ardelean.

Figure 3. *Euphydryas aurinia* – Gârbovu, Dealu Mare Monastery (Gorj County). May 9, 2015; photo Florin Prunar and Adorian Ardelean.

records from Oltenia, Iftime's one extends the known distribution of the Marsh Fritillary further south in Romania, proving that stable populations of this butterfly are found also between the Transylvanian Alps and the Danube.

Discussion

In most of Europe, the Marsh Fritillary is a grassland specialist that can be found in wet, unfertilized meadows. According to Rákosy (2013), all known populations on the territory of Romania are found in wet meadows that harbour the most important food plant of this butterfly across its European range: the devil's-bit (*Succisa pratensis*). However, next to this, other species of related genera (*Knautia sp., Scabiosa sp.* and also *Centaurea sp.*, *Lonicera sp., Symphoricarpos* sp., *Gentiana sp.*, *Teucrium* sp., *Plantago sp., Primula sp., Digitalis sp., Veronica* sp. and *Centranthus* sp.) have been reported also as foodplants of the Marsh Fritillary (e.g. Peńuelas et al. 2006; Švitra and Sielezniew 2010 etc).

Along with the Apollo butterfly *Parnassius apollo* (Linnaeus, 1758) and the large blue *Phengaris arion* (Linnaeus, 1758), the Marsh Fritillary is one of the most frequently occurring species within the European Prime Butterfly Areas (PBA), each of these 3 species being found in over 100 PBAs (van Swaay and Warren 2006).

Figure 4. *Euphydryas aurinia*, female – Goia, Voineasca forest (Argeş County). May 7, 2022; photo Alexandru Iftime.

Together with the large scarce blue *Phengaris teleius* (Bergsträsser, 1779) these three species also have the largest number of identified breeding areas, with at least 1000 estimated populations within the PBAs. However, very few species have undergone increase of the local populations on PBAs, the maximum being the one of the Marsh Fritillary with five sites (but for 37 sites, the overall reported abundance has decreased, for 71 sites it was found to be stable and for 60 sites, the overall reported abundance was considered unknown – van Swaay and Warren 2006). Given these, the Marsh Fritillary appears as a species with high protective potential at least all over its European range.

But through much of this distribution range, the Marsh Fritillary depends on the maintenance of traditional low intensity grazing regimes. Although this species has highly dynamic populations, it is declining due to the isolation and fragmentation of its natural habitats as well as from changing management mainly through agricultural improvements, drainage, abandonment of pasture land, successional changes and inappropriate grassland management. Other encountered threats include afforestation (especially on non-woodland habitats), chemical pollution due to excessive use of herbicides, pesticides and also chemical fertilizers, built-up area development, change,

abandonment of management or even destruction of woodland (e.g., replanting with conifers), recreational pressure and disturbance etc. Moreover, carrying on the traditional agricultural practices in wet meadows as well as in wet forest meadows and clearings is seen as a critical issue not only for the Marsh Fritillary, but also for many other wildlife groups and will require action both at a regional and local level. Finally, the conservation of the Marsh Fritillary requires that wet meadows should be used extensively and that excessive expansion of trees and shrubs should be prevented (van Swaay et al. 2012).

Aside from preserving the natural habitats suitable for this species, the records presented in this paper convincingly demonstrate that further efforts must be carried out for a better mapping and monitoring of this species in Romania, to increase the number of known populations, to assess their conservation status and to fill the gaps in the known distribution of this species. Besides, studies should be undertaken to increase the knowledge of the biology at this species, in order to build effective conservation strategies.

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